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EXAMINER

ZERVIGON, RUDY

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* KARL A. LITTAU,  
CHILIANG L. CHEN, and  
ANAND VASUDEV

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Appeal 2011-006308  
Application 08/893,917  
Technology Center 1700

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Before PETER F. KRATZ, JEFFREY T. SMITH, and  
BEVERLY A. FRANKLIN, *Administrative Patent Judges*.

FRANKLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's rejection of claims 22-24 and 27-28. We have jurisdiction under 35 U.S.C. § 6.

STATEMENT OF THE CASE

Claim 22 is representative of the subject matter on appeal and is set forth below:

22. A method of removing residue from a substrate processing chamber, said method comprising the steps of:

forming a plasma remotely with respect to said chamber, said plasma including a plurality of reactive radicals;

forming a flow of said reactive radicals traversing toward said chamber;

forming a nonplasma diluent gas flow, wherein said nonplasma diluent gas flow comprises at least one of an inert gas or a reduction gas;

mixing said flow of said reactive radicals and said diluent gas flow at a mixing location downstream of a location of forming said flow of said reactive radicals and anterior to said chamber to form a gas-radical mixture; and

flowing said gas-radical mixture into said chamber to remove residue from within said chamber,

wherein each step of the method occurs without a wafer in said chamber.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Markunas	5,018,479	May 28, 1991
Shang	5,788,778	Aug. 4, 1998

#### THE REJECTION

1. Claims 22-24 and 27-28 stand rejected as being obvious under 35 U.S.C. § 103(a) over Shang in view of Markunas.

### ISSUE

Did the Examiner err in determining that Shang teaches to mix a nonplasma diluent gas from section 32/34 of the apparatus depicted in Figure 1 with a flow of reactive radicals generated by a plasma remote to processing chamber 10 of the apparatus depicted in Figure 1 of Shang during a method for removing residue from processing chamber 10? If there is no such teaching in Shang, then Shang does not suggest the subject matter recited in Appellants' claim 1.

We answer this question in the affirmative and REVERSE.

### ANALYSIS

It is basically the Examiner's position that Shang teaches to mix diluent gas from section 32/34 of the apparatus depicted in Figure 1 with the flow of reactive radicals generated remote from processing chamber 10 of the apparatus depicted in Figure 1 of Shang during a method for removing residue from processing chamber 10. We disagree because, as pointed out by Appellants on page 3 of the Reply Brief, the diluent gas from section 32/34 of the apparatus depicted in Figure 1 is used during a deposition process, while the reactive radicals, generated remote from the processing chamber by activating precursor gas 44, are used to clean the inside of the processing chamber 10. The Examiner has not established that the asserted gas mixing occurs at location 33 during residue removal given that Shang's deposition and cleaning processes are mutually exclusive. Shang, col. 4, ll. 21-39. While Shang indicates that the first and second gas supplies may be combined if the gases are such that mixing is desired (Shang, col. 4, ll. 37-

39), the Examiner has not established that the desired combination/mixing of gases referred to by Shang occurs during a cleaning process and at a location downstream of the location where the reactive radical flow is formed. The gas combination discussed by Shang could occur at other locations and/or during a deposition process, and not during a cleaning process, as made evident by the disclosure in the paragraph bridging columns 4 and 5 of Shang. Hence, we agree with Appellants that the Examiner's interpretation of Shang in this regard is not supported by a preponderance of the evidence on this record. The Examiner's reliance upon the secondary reference of Markunas does not cure this deficiency of Shang with respect to teaching subject matter embraced by the appealed claims.

In view of the above, we, therefore, reverse the rejection.

#### CONCLUSIONS OF LAW AND DECISION

The rejection is reversed.

REVERSED

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